

## ***Plesiomenaeus poorei* gen. nov., sp nov., (Crustacea: Decapoda: Pontoniinae) from Zanzibar**

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### **Abstract**

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A new genus, *Plesiomenaeus*, is designated for a new species of sponge associated pontoniine shrimp, *P. poorei*, from Zanzibar, which is described and illustrated. The new genus resembles *Periclimenaeus* Borradaile, from which it is distinguished particularly by the lack of a molar process and fossa on the fingers of the major second pereopod. *Plesiomenaeus poorei* also closely resembles *Periclimenaeus bouvieri* (Nobili) and the relationship is discussed.

### **Keywords**

*Plesiomenaeus poorei* gen. nov., sp. nov., Crustacea: Decapoda: Pontoniinae, sponge associate, Zanzibar.

### **Introduction**

Recent re-examination of some specimens from Zanzibar, provisionally identified as *Periclimenaeus?* sp. nov., indicated that they were not members of the genus *Periclimenaeus* Borradaile, 1915, *sensu stricto*, as the fingers of the major second pereopod lacked the characteristic features of the second pereopod of that genus, in which the fingers are provided with a dactylar molar process and opposing fossa on the fixed finger. The specimens could not be referred to any other pontoniine genus and a new genus is now designated for their reception. The new species resembles very closely the species *Typton bouvieri* described from Djibouti by Nobili (1904, 1906) and also reported from Suez by Balss (1927). There have been no subsequent reports of Nobili's species, which was transferred to the genus *Periclimenaeus* Borradaile, 1915, by Holthuis (1952). Holthuis, when examining the five syntypes, noted that the major second pereopod dactyl has the cutting edge provided with "a strong hammer shaped tooth fitting into a cavity on the fixed finger", clearly indicating that *T. bouvieri* is correctly placed in *Periclimenaeus* Borradaile.

Abbreviations used: CL, postorbital carapace length; NMV, National Museum of Victoria, Melbourne; MNHN, Muséum National d'Histoire Naturelle, Paris; RMNH, Nationaal Natuurhistorisch Museum–Naturalis, Leiden; OUMNH, Oxford University Museum of Natural History, Oxford; QM, Queensland Museum, Brisbane.

### **Systematic Account**

FAMILY PALAEMONIDAE Rafinesque, 1815

Subfamily Pontoniinae Kingsley, 1878

### ***Plesiomenaeus* gen. nov.**

**Diagnosis** Rostrum greatly reduced, compressed, uni-dentate, carapace without supraorbital, epigastric, hepatic or antennal spines, inferior orbital angle acute, first abdominal tergite without anteromedian lobe, pleura rounded, telson with two pairs of small dorsal spines, three pairs of posterior marginal spines, scaphocerite reduced, labrum normal, mandible without palp, maxillipeds with flagella slender, with four long, plumose terminal setae, maxilla with basal endite simple, third maxilliped with ischiomerus and basis fused, coxa without arthrobranch, fourth thoracic sternite without median process, first pereopod chela with fingers subspatulate, cutting edges entire, dactyl with tridentate tip, medial and lateral teeth denticulate, fixed finger distally bidentate, second pereopods well developed, unequal, similar, major dactyl fingers simple, without molar process and fossa, minor fingers non-shearing, ambulatory pereopods robust, third propod most slender, fifth propod stoutest, dactyls simply biunguiculate, uropodal propod unarmed, exopod of uropod with distolateral tooth and spine.

**Type species.** *Plesiomenaeus poorei* sp. nov., by present selection and monotypy.

**Etymology.** From *plesios* (Greek) near, and part of the name *Periclimenaeus*, first used by Borradaile (1915), as the shrimp was initially identified as a strange *Periclimenaeus*. Gender masculine.

**Systematic position.** The genus *Plesiomenaeus* most closely resembles the genus *Periclimenaeus* Borradaile 1915, type species *Periclimenaeus robustus* Borradaile, 1915 (re-described by Bruce, 2005). In this species a marked thickening

of the posterior three fifths of the second pereopod dactylar cutting edge is distinctly demarcated from the swollen base of the dactyl (Bruce, 2005, fig. 2C). This thickened portion is less developed than in several other species of the genus where it forms the typical posteriorly and anteriorly demarcated molar tooth, with a large well delineated opposing socket on the fixed finger. In *P. robustus*, and other species of *Periclimenaeus*, the occlusal surface of this thickened portion is distinctly flattened. In *Periclimenaeus*, and many other pontonine genera, the proximal occlusal end of the dactyl is normally swollen and quite distinct from the molar process which is developed on the intermediate portion of the cutting edge (see fig. 4J, *Periclimeaeus gorgonidarum* (Balss), Wilson Island, Queensland, 6.0 m, coll. N.L. Bruce, 28 August 1980, AJB 3106, QM W28914). In contrast, in *Plesiomenaeus* there is no trace of a molar process in this position. The proximal dactyl is swollen and articulates in a deep longitudinal depression in the proximal fixed finger but this lacks a defined anterior margin and does not form a socket. In *Plesiomenaeus* the second pereopod chelae are similar but differing in size, in contrast in *Periclimenaeus* they are of different morphology. *Plesiomenaeus* also lacks the anteromedian lobe on the dorsal margin of the first abdominal tergite conspicuous in *P. robustus*.

***Plesiomenaeus poorei* sp. nov.**

Figures 1–7

*Material examined.* 1 ovig. ♀, holotype, Chukwani, Unguja, Zanzibar, 6° 13' 60"S 30° 13' 00"E, 0.1m at low water spring tide, 4 December 1960, coll. A.J. Bruce, #271, NMV J59993. 1 ♂, allotype, *idem*, NMV J59994. Ovig. ♀, dissected, *idem*, NMV J59995. 1 ♂, 1 ovig. ♀, paratypes, *idem*, MNHN-Na17209. 1 ♂, 1 ovig. ♀, paratypes, *idem*, QM W28956. 1 ♂, 1 ovig. ♀, paratypes, *idem*, OUMNH. ZC.2009-12-001. 1 ♂, 1 ovig. ♀, paratypes, *idem*, RMNH D 53113.

*Diagnosis.* With the characters of the genus. Very short rostrum generally with single dorsal tooth only, proximal segment of antennular peduncle distolaterally rounded, without acute tooth, ventral border of second pereopod merus non-tuberculate.

*Description.* A stoutly built shrimp of subcylindrical body form (fig. 1).

Rostrum (fig. 6A) very short, about 0.06 of CL, compressed, triangular, acute, with single acute dorsal tooth, carapace (fig. 2A) smooth, without supraorbital, epigastric, hepatic or antennal spines, inferior orbital angle (fig. 2B) acute, pterygostomial angle strongly produced, rounded.

Abdomen smooth, first segment without anterior median dorsal lobe, pleura rounded, sixth segment (fig. 2C) depressed, about 0.24 of CL, with small subacute posterolateral tooth and much larger, acute posteroventral tooth; telson (fig. 2D) about 0.35 of CL, 2.15 times longer than anterior width, lateral margins slightly convex, tapering posteriorly, posterior margin rounded (figs 2E, 6J) two pairs of small submarginal dorsal spines, about 0.08 of telson length, anterior pair at 0.65 of telson length, posterior pair at about 0.96 (see Remarks), with three pairs of marginal spines, lateral spines similar to dorsal spines, intermediate spines about 0.1 of telson length,

submedian spines more slender, finely setulose, about 0.8 of intermediate spine length.

Antennule (fig. 2F) with proximal segment of peduncle (fig. 2G) about twice as long as proximal width, lateral margin straight, non-setose, without ventromedial tooth, lateral margin angular, distolateral angle rounded (fig. 6B) with 1–2 short plumose setae, sometimes acute, stylocerite acute, projecting laterally, reaching to about half segment length, statocyst poorly developed, without statolith, intermediate and distal segments short and broad, combined length about 0.4 of proximal segment length, upper flagellum short, biramous, with proximal 8 segments fused, short free ramus with single long segment, with 2 groups of aesthetascs, longer free ramus with 5 slender segments, lower flagellum short, filiform with 10 segments.

Antenna (fig. 2H) with carpoperite subcylindrical, about 3.0 times longer than wide, basicerite robust, without lateral tooth, with large rounded protuberant antennal gland process medially; scaphocerite (fig. 2I) small, subequal to carpoperite length, about 2.7 times longer than wide, distally rounded, lateral margin straight with small acute distal tooth, at about 0.9 of scaphocerite length, well short of margin of lamella, distal and medial margins with numerous short plumose setae.

Epistome unarmed, without special features.

Eye, (fig. 2J), with hemispherical cornea, well pigmented, diameter about 0.13 of CL, without accessory ocellus, stalk globular, about 1.1 times longer than wide.

Mandible (fig. 3A) small, without palp, molar process (fig. 6D) subcylindrical, tapering distally, distally obliquely truncate with two small teeth and numerous rows of short spiniform setae, incisor process small (fig. 6E) narrow, distally rounded with three small acute teeth laterally, two smaller teeth medially.

Maxillula (fig. 3B) with bilobed palp (fig. 6F), upper lobe larger than lower, lower tapering with distal tubercle with short slender terminal seta, upper lacinia (fig. 6G) short and broad, upper margin emarginate, distal margin broadly truncate with about 16 short simple spines and scattered setae, lower lacinia tapering distally with six terminal spines and numerous spiniform setae.

Maxilla (fig. 3C) with simple tapering palp, with few short plumose setae proximo-laterally, basal endite simple, short and broad, with 10 slender sparsely setulose terminal setae, coxal endite obsolete, medial margin broadly rounded, non-setose, scaphognathite well developed, about 2.6 times longer than wide, anterior lobe as long as wide, medial margin concave, posterior lobe about 0.8 of anterior lobe length.

First maxilliped (fig. 3D) with palp (fig. 6H) about 2.5 times longer than wide, distally rounded, with two preterminal feebly setulose setae disto-medially, basal and coxal endites fused, distally rounded medial margin straight, with numerous slender sparsely setulose marginal setae, exopod with well developed caridean lobe, flagellum slender with four long plumose terminal setae, epipod well developed, bilobed.

Second maxilliped (fig. 3E) with endopod normally developed, dactylar segment about 3.4 times longer than broad, medial margin with numerous long slender coarsely setulose or finely denticulate spines, propodal segment distomedially

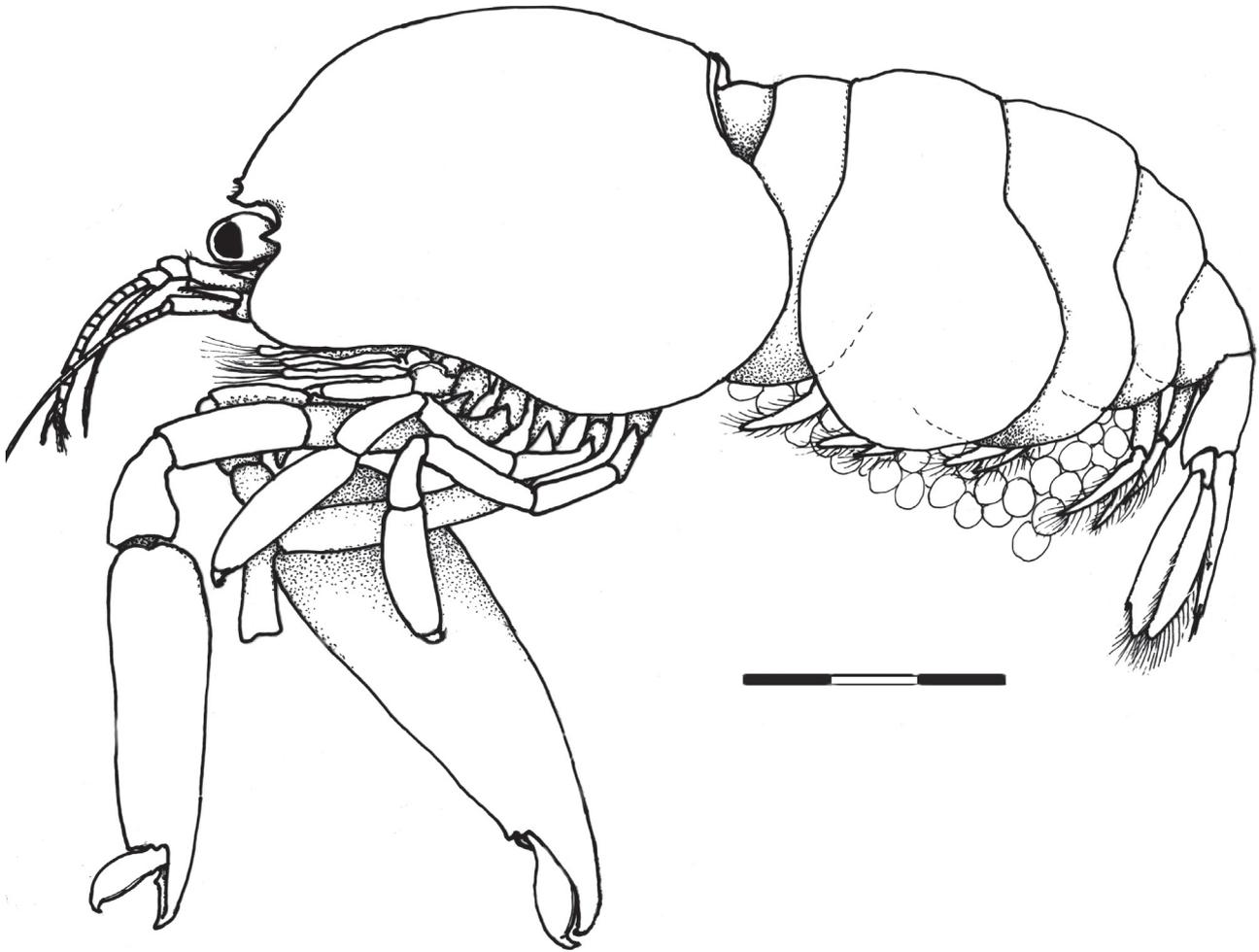


Figure 1. *Plesiomenaeus poorei* gen. nov., sp. nov., ovig. ♀. Holotype, NMV J59993, Scale bar in millimetres.

produced, with numerous long slender sparsely setulose marginal spines, proximal endopod segments normal, basis with slender flagellum, coxa with small suboval epipod, without podobranch.

Third maxilliped (fig. 3F) with ischiomerus and basis fully fused, combined segment about 3.0 times longer than maximal width, tapering distally, medial margin straight with numerous long slender simple setae, carpus subcylindrical, half ischiomerus-basis length, 4.0 times longer than wide, with numerous spiniform setae medially, distal segment missing in dissected specimen, exopod with slender flagellum, slightly exceeding distal merus, with four major plumose terminal setae (broken off in dissected specimen), coxal with well developed low rounded lateral plate, without arthrobranch. Paragnaths (fig. 6C) deeply bilobed.

Thoracic sternites unarmed, narrowest at fourth and fifth segment levels and broadening anteriorly and posteriorly.

First pereiopod (fig. 4A) short, robust, chela (fig. 4B) with palm 1.5 times longer than deep, compressed, with numerous short simple cleaning setae proximo-ventrally, fingers subspatulate, with numerous groups of short simple setae, cutting edges entire, dactyl with tridentate tip (fig. 6I) medial and lateral teeth posteriorly tuberculate, fixed finger distally deeply bidentate (fig. 6I) simple; carpus 0.59 of chela length, 2.9 times longer than distal width, with transverse row of distal marginal cleaning setae with 3 long distoventral setae; merus 1.3 times longer than chela, 5.7 times longer than wide, uniform, slightly bowed; ischium 0.33 of chela length, 0.28 of meral length, basis subequal to ischial length; coxa robust, without ventral process, with dorsal flange.

Second pereiopods well developed, unequal, similar, fingers up-curved. Major chela (fig. 4C) length subequal to CL, palm smooth, oval in section, about 2.1 times longer than

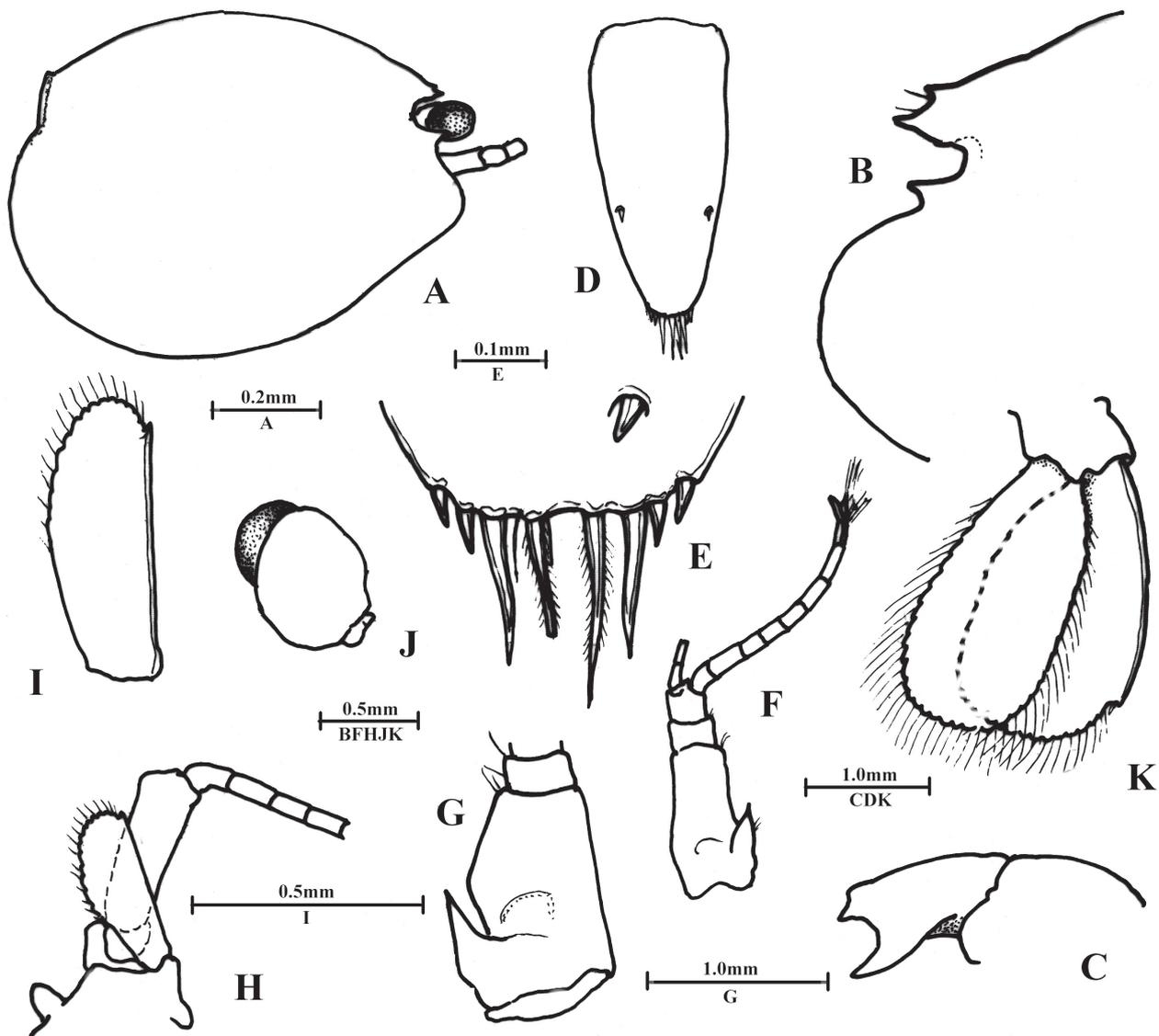


Figure 2. *Plesiomeneaeus poorei* gen. nov., sp., ovig. ♀. NMV J59994. A, carapace and rostrum. B, anterior carapace and rostrum. C, sixth abdominal segment, lateral. D, telson. E, same, posterior spines, dorsal spine inset. F, antennule. G, same, proximal segment. H, antenna. I, scaphocerite. J, eye. K, uropod.

deep, tapering distally, distal width about 0.6 of maximal width, non-setose; fingers (fig. 4CDE) 0.25 of palm length, dactyl about 3.0 times longer than proximal depth, dorsal margin convex, with strong acute tip, cutting edge without molar process, unarmed, feebly convex, entire, sharp, fixed finger about 1.8 times longer than proximal depth, ventral margin convex, with acute tip distally, occlusal edge longitudinally grooved throughout length with deep depression proximally, dorsal margin with bluntly triangular tooth proximally, with sharp entire cutting edge, ventral cutting

edge similar, without proximal tooth, carpus robust, about 0.4 of palm length, distally expanded, 1.5 times longer than distal width, tapering strongly proximally, unarmed, merus about 0.5 of palm length, 3.0 times longer than wide, unarmed, ventrally non-tuberculate; ischium 0.8 of merus length, 0.4 of palm length, 2.4 times longer than distal width, tapering proximally, unarmed, basis and coxa robust, without special features. Minor second pereiopod chela (fig. 4G) similar to major chela, subequal to palm length of major chela, palm 3.5 times longer than depth, tapering slightly distally, fingers (fig.

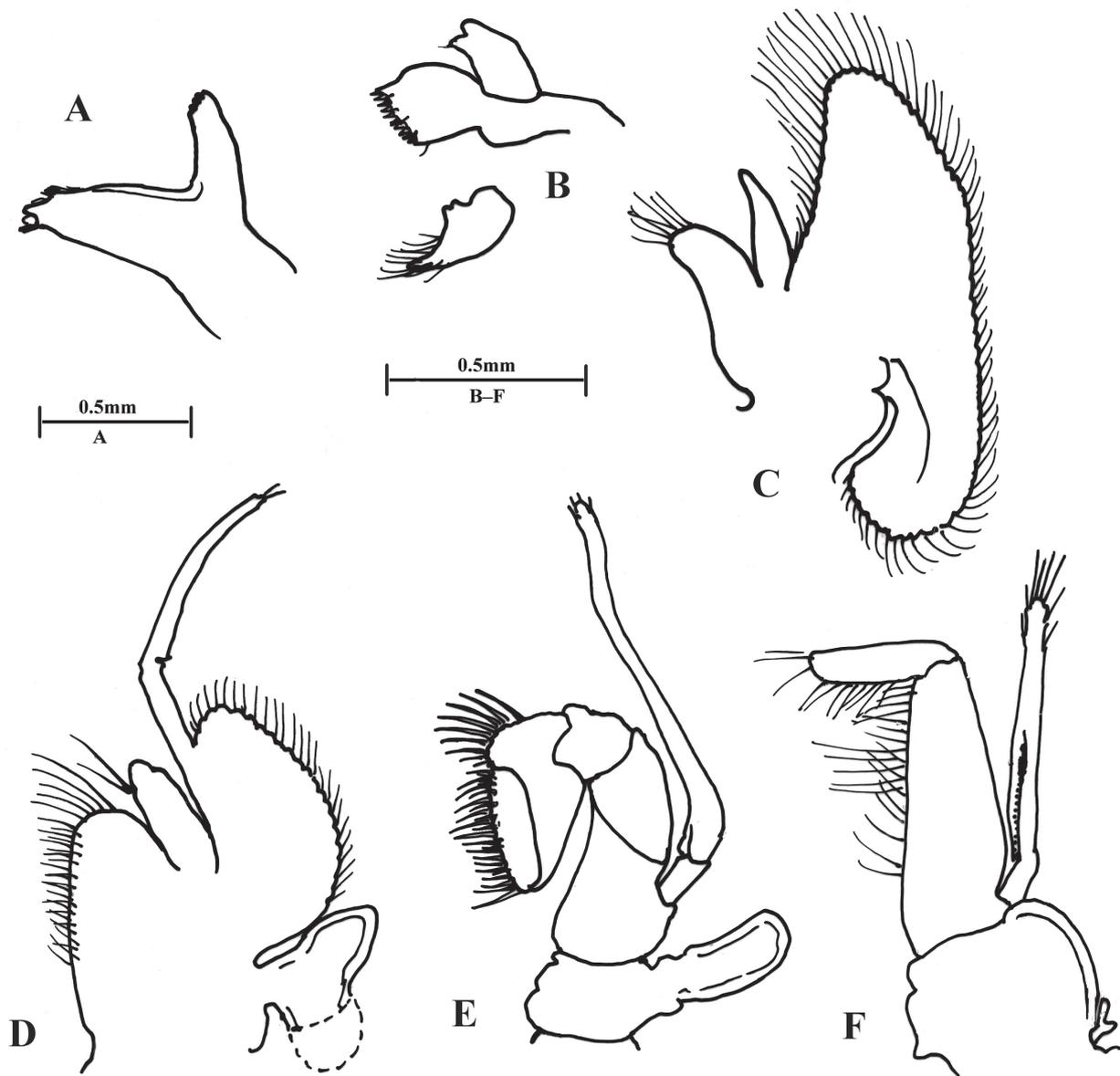


Figure 3. *Plesiomenaeus poorei* gen. nov., sp. nov., ovig. ♀. NMV J59994. A, mandible. B, maxillula. C, maxilla. D, first maxilliped. E, second maxilliped. F, third maxilliped (terminal segment of endopod missing).

4H) 0.25 of palm length, similar to major chela, carpus 0.33 of palm length, 2.0 times longer than distal width; proximal segments as for major chela but smaller.

Third ambulatory pereiopod (fig. 4I) moderately slender, reaching beyond carpoperite by propod and dactyl; dactyl short, stout, compressed, about 0.12 of propod length, unguis well developed, curved, 2.2 times longer than basal width, 0.33 of corpus length, unarmed, corpus 1.2 times longer than proximal depth, with dorsal margin strongly convex, ventral margin sinuous, distally concave, sharp, unarmed, with acute distal

accessory tooth, about 0.5 of unguis length, with several simple ventral sensory setae; propod about 0.3 of CL, 5.5 times longer than proximal width, tapering distally, distal width 0.66 of proximal width, with three stout spines distally, medial, lateral and ventral, medial spine longest, 3.7 times longer than basal width, projecting beyond dorsal margin of flexed dactyl, ventral spine shortest, 0.8 of medial spine length, ventral margin of propod otherwise without spines; carpus 0.8 of propod length, 4.0 times longer than distal width, slightly tapering proximally, unarmed; merus subequal to propod length, 3.4 times longer

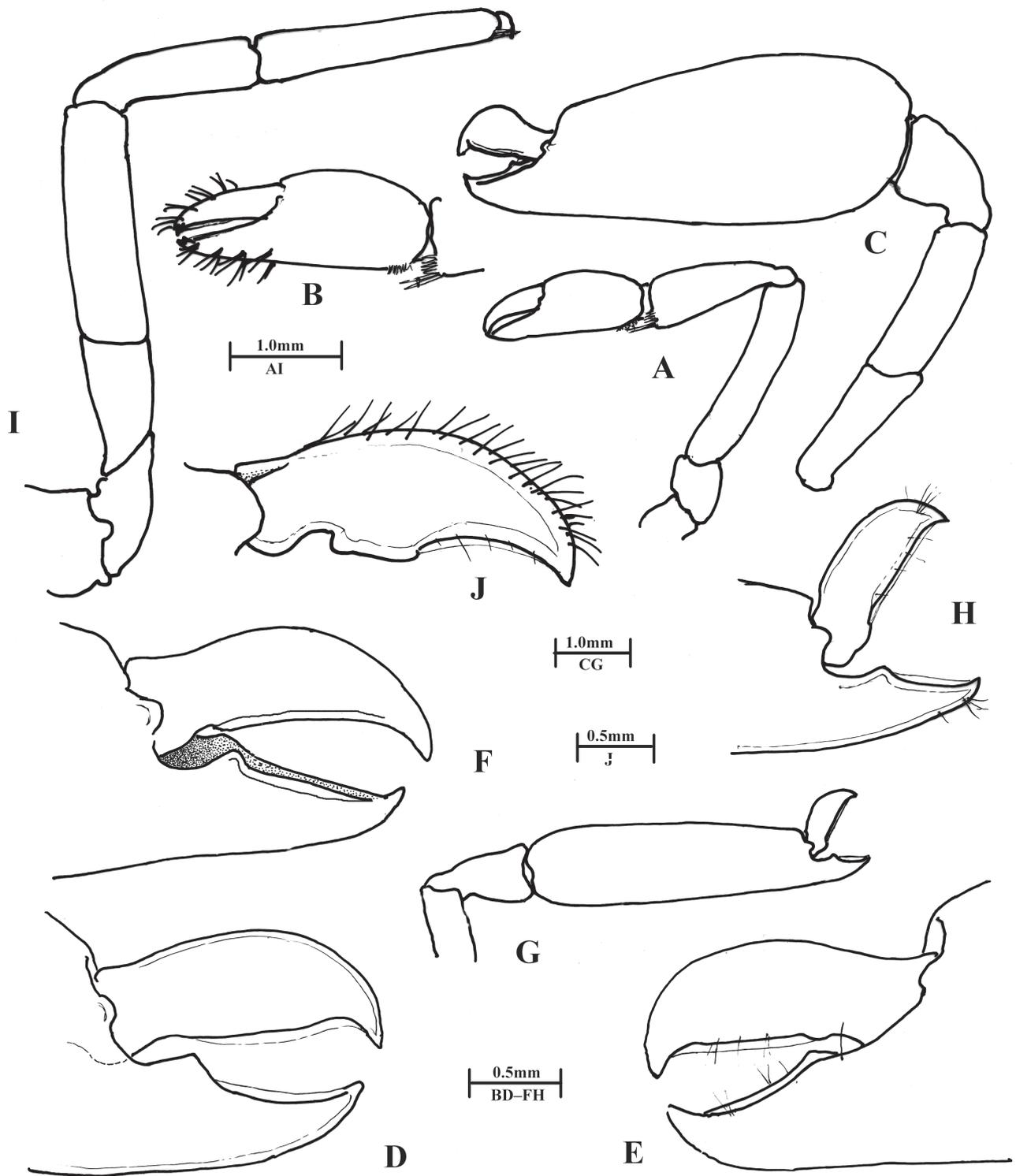


Figure 4. *Plesiomenaeus poorei* gen. nov., sp. nov., ovig. ♀ holotype, NMV J59993. A, first pereiopod. B, same, chela. C, major second pereiopod, D, same, fingers, lateral. E, same, medial. F, same, oblique. G, minor second pereiopod, chela and carpus. H, same, fingers. I, third pereiopod. J, *Periclimenaeus gorgonidarum* (Balss), QM W28914, major second pereiopod dactyl.

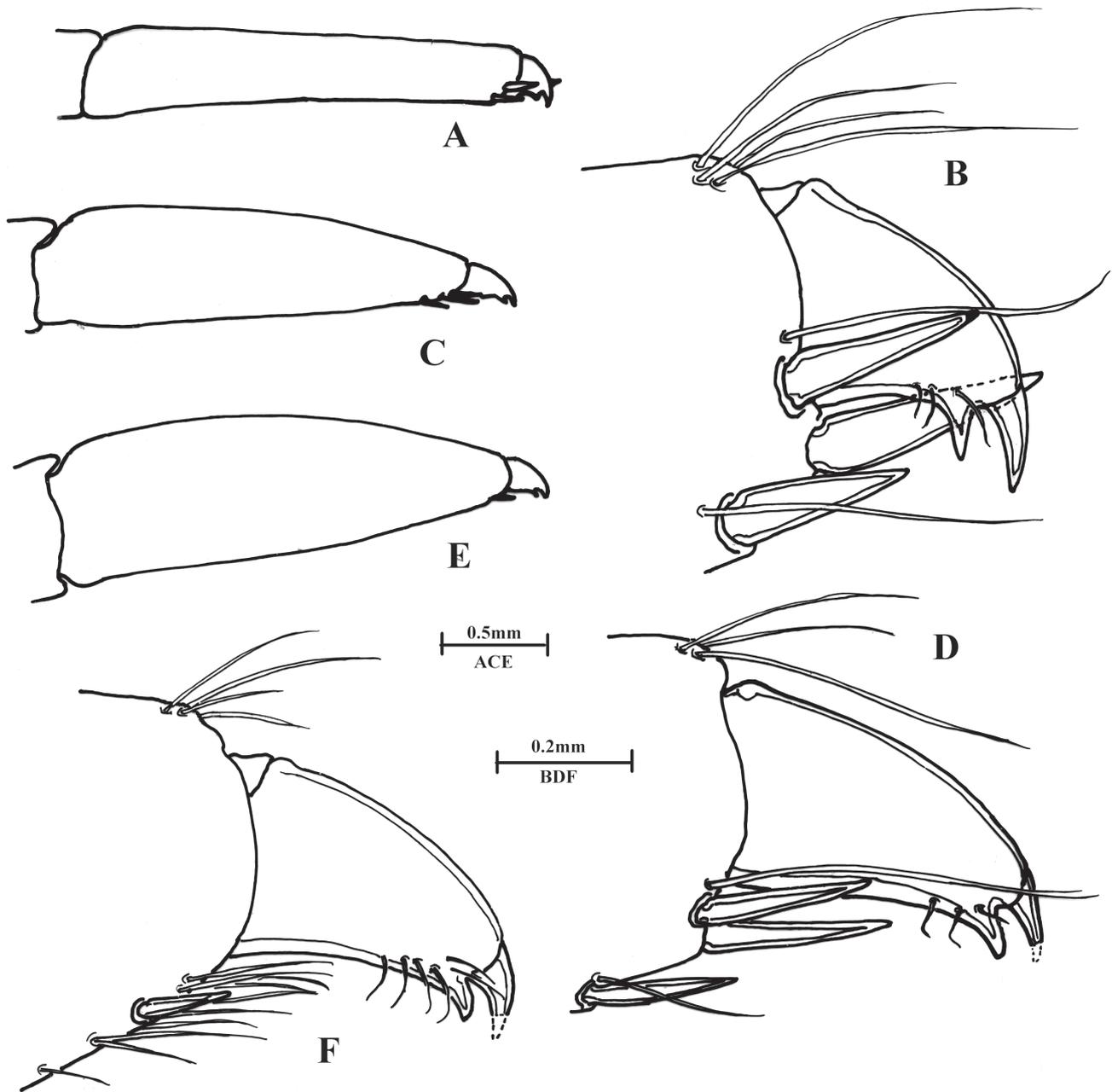


Figure 5. *Plesiomenaeus poorei* gen. nov., sp. nov., ovig. ♀. NMV J59994. A, third pereiopod, propod and dactyl. B, same, distal propod and dactyl. C, fourth pereiopod, propod and dactyl. D, same, distal propod and dactyl. E, fifth pereiopod, propod and dactyl. F, same, distal propod and dactyl.

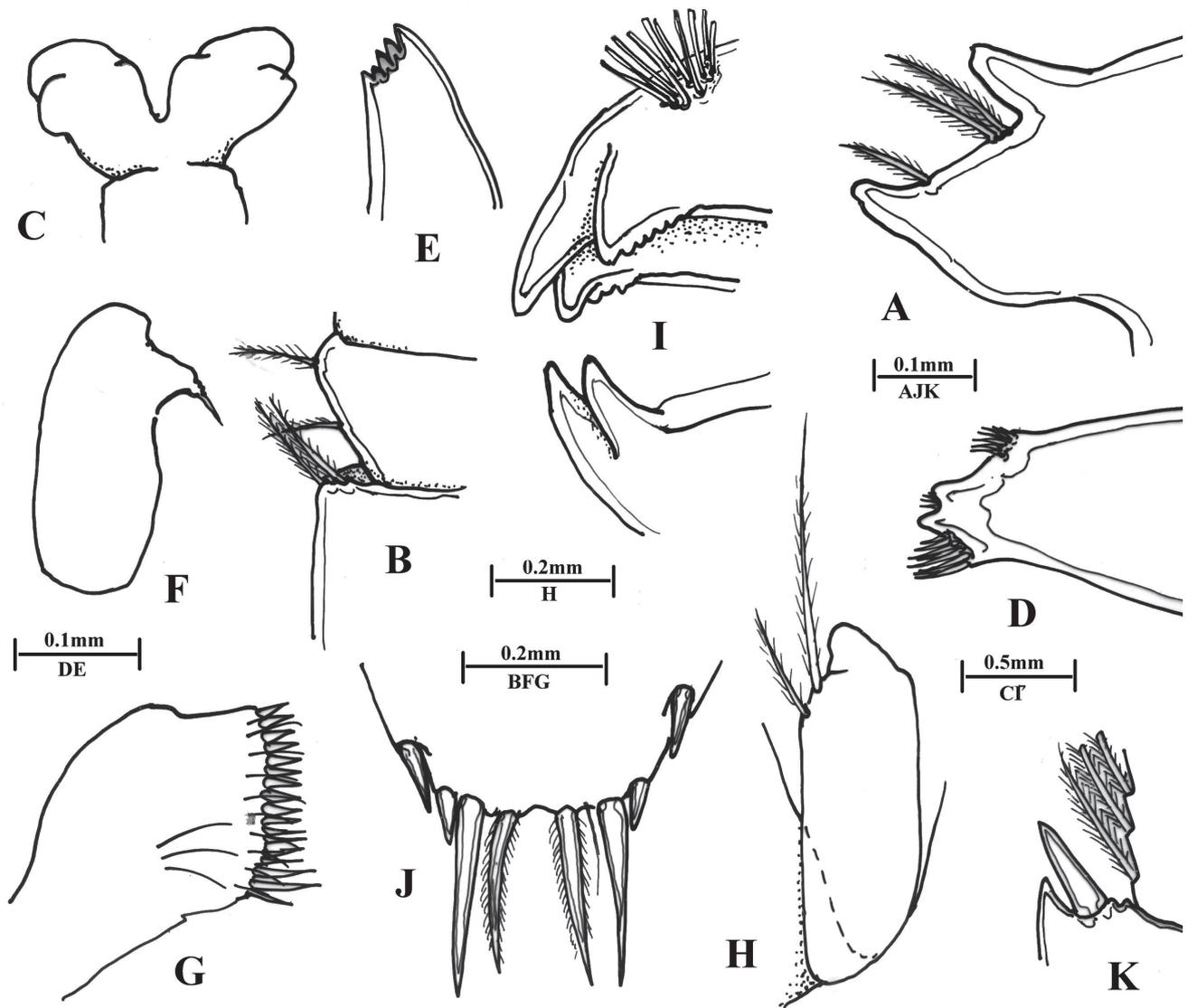


Figure 6. *Plesiomenaeus poorei* gen. nov., sp., ovig. ♀, NMV J59994. A, rostrum. B, antenna, distolateral angle of proximal segment. C, paragnath, D, mandible, molar process. E, same, incisor process. F, maxillula, palp. G, same upper lacinia. H, first maxilliped, palp. I, first pereiopod chela, finger tips. J, telson, posterior margin. K, uropod, distolateral exopod.

than wide, unarmed; ischium 0.55 of propod length, twice as long as distal width, tapering proximally, unarmed; basis and coxa without special features. Fourth pereiopod similar, propod subequal in length but more swollen, 3.6 times longer than proximal depth, maximal width 3.0 times distal width, with shorter, more slender medial, lateral and ventral spines, dactyl with corpus 1.6 times longer than proximal depth, unguis 0.2 of corpus length, accessory tooth smaller. Fifth pereiopod similar, propod subequal in length but propod more swollen than fourth, 3.2 times longer than proximal depth, maximal width 2.8 times distal width, with single small ventral spine and numerous

distoventral setae, dactyl about 0.12 of propod length, with corpus 1.5 times longer than proximal depth, unguis 0.2 of corpus length, accessory tooth smaller.

First pleopod (fig. 7C) male paratype (CL 3.4mm) with protopod about 2.5 times longer than broad, exopod subequal to protopod length, 5.0 times longer than wide with numerous plumose marginal setae, endopod, 0.7 of exopod length, 5.0 times longer than proximal width, tapering distally, without medial accessory lobe, with numerous, about 20, simple spiniform setae scattered along medial border. Second pleopod (fig. 7D) with protopod 2.0 times longer than wide, greatest

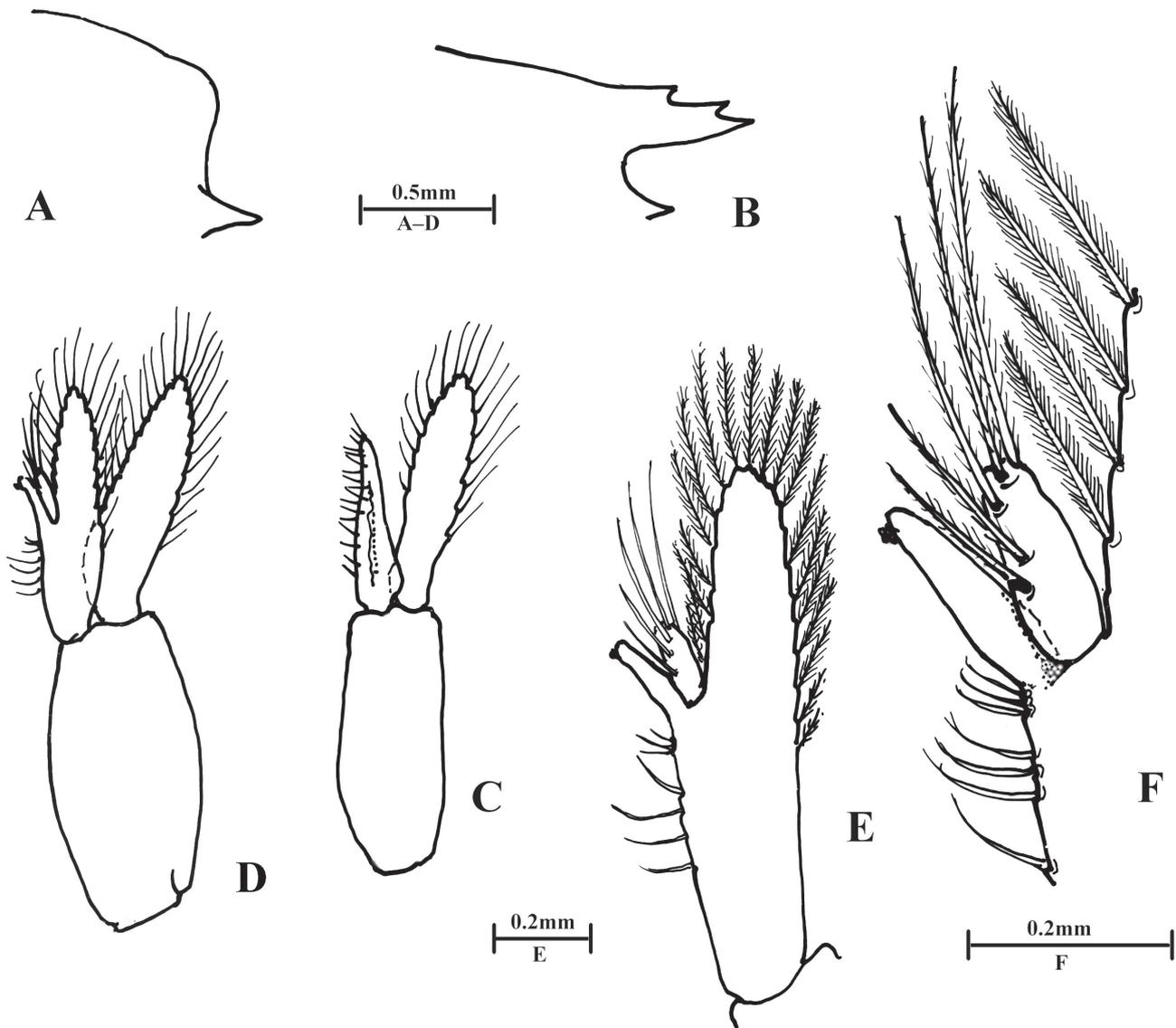


Figure 7. *Plesiomenaeus poorei* gen. nov., sp. nov. A, abnormal rostrum, ovig. female paratype. B, rostrum, male paratype, CL 3.4. C, first pleopod. D, same, endopod. E, second pleopod. F, same, endopod. G, same, appendices, masculina and interna.

width centrally, 1.2 times longer than first pleopod protopod, exopod similar to first pleopod, endopod (fig. 7E) subequal exopod length, 4.4 times longer than central width, with numerous plumose marginal setae distally, appendices (fig. 7F) at 0.55 of medial margin length, appendix masculina subcylindrical, 2.5 times longer than wide, about 0.16 of endopod length, with 5 setulose setae of increasing length distally along medial margin, terminal seta longest, about twice corpus length' appendix interna slightly longer than appendix masculina, with few terminal cincinnuli.

Uropod (fig. 2K) with protopod unarmed; exopod broad, about 1.6 times longer than broad, lateral margin feebly

convex, non-setose with small acute distal tooth (fig. 6K) with small spine medially (see *Remarks*); endopod 0.95 of exopod length, 2.0 times longer than wide.

*Measurements (mms)*. Holotype, ovigerous female, postorbital carapace length, 6.0; carapace and rostrum, 6.4; total body length (approx.) 17.0; second pereiopod, major chela, 6.0; minor chela, 5.0; length of ovum, 0.55.

*Etymology*. Named for Dr Gary C.B. Poore, Principal Curator (Marine Biology), Museum of Victoria, in recognition of his major contributions to Australian and wider carcinology over many years.

*Host.* Unidentified sponge encrusting round the base of a coral colony.

*Colouration.* No data.

*Remarks.* The telson of the holotype is slightly abnormal in that the posterior pair of dorsal spines are placed on the posterior margin of the telson which thus presents the appearance of having four pairs of posterior marginal spines, with only a single pair of dorsal spines. One female (fig. 7A) was without a rostrum, the absence appearing congenital rather than traumatic. Two of the male specimens (fig. 7B) had two rostral teeth. Some specimens had a small acute distolateral tooth on the proximal segment of the antennular peduncle, usually asymmetrically.

The presence of slender propods on the third pereopod and stouter propods on the posterior limbs is unusual in pontoniine shrimps. In some species of the closely related genus *Periclimenaeus* the propods are not greatly different but in others, such as *P. crassipes* Calman and *P. trispinosus* Bruce, the third pereopod propods are particularly short and stout and the posterior propods longer and more slender, in contrast to their development in *P. poorei* sp. nov.

Despite intensive collecting over the coral reefs of Zanzibar, and similar reefs in Tanganyika and Kenya, over several years, resulting in numerous other sponge associated shrimps, no further specimens of this species were ever collected.

The resemblance of *P. poorei* sp. nov. to *Periclimenaeus bouvieri* (Nobili) is remarkable. Holthuis's statement that "a strong hammer shaped tooth fitting into a cavity on the fixed finger", leaves little doubt concerning these features and the placement of Nobili's species in *Periclimenaeus*. Re-examination of the type material of Nobili's species may shed further light on the detailed morphology of the fingers of the major second pereopod and hence its exact systematic position. *Plesiomenaeus poorei* sp. nov. is readily distinguished from *Periclimenaeus bouvieri* by having only a single dorsal

rostral tooth in females and a non-tuberculate second pereopod merus as opposed to two dorsal rostral teeth and a ventrally tuberculate merus in addition to the absence of a molar process and fossa on the major second pereopod fingers. The type material of *Typton bouvieri* is held in the collections of the Museo Regionale di Scienze Naturali, Torino.

#### Acknowledgements

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